Outline: ◦ Problem set

- adverse selection
  - steps / nonlinear pricing
  - insurance market (graphs)
  - optimal income taxation
  - regulation with many types (waiver + general)

Nonlinear pricing

Monopolist cares about $T - cq$

Buyer cares about $\theta v(q) - T$

- θ is unknown to the monopolist

1] Use revelation principle to restrict attention to $(q_H, T_H), (q_L, T_L)$ + (IC_H) + (IC_L) + (IR_H) + (IR_L)

2] $(IC_H) + (IR_L) \Rightarrow IR_H$

3] Look at first best. Here, we see that high type wants to mimic the low type. Ignore (IC_L)

4] Only have (IC_H) and (IR_L). Show that both are binding.

5] Solve. Have trade-off between rent extraction (surplus) and allocative efficiency

Results. • Give an informational rent to the high type (rents to the high)

• Distortion to the low type

Insurer / monopolist

- $\underbrace{I}_{\text{premium}} - p(\underbrace{L}_{\text{loss}} - \underbrace{D}_{\text{deductible}})$ insurance company
- $p \in \{p_L, p_H\}$, $0 < p_L < p_H$, $\Pr[p = p_H] = \beta$

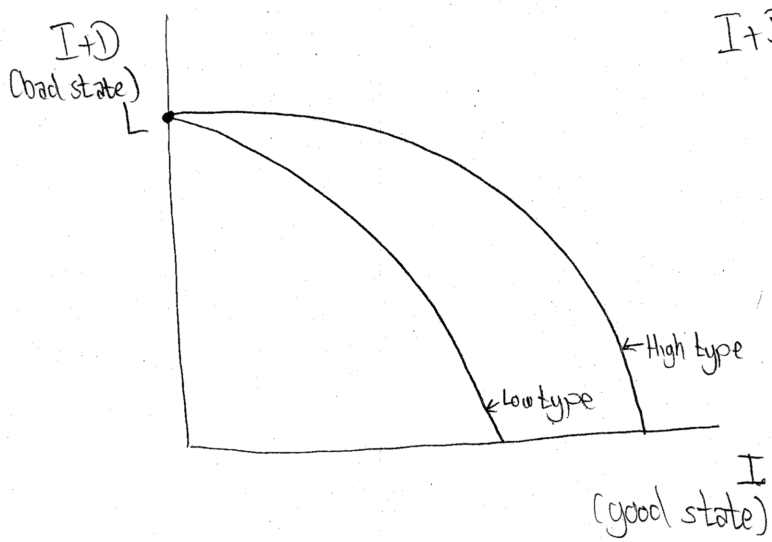
$\exists$ (I_H, p_H), (I_L, p_L)

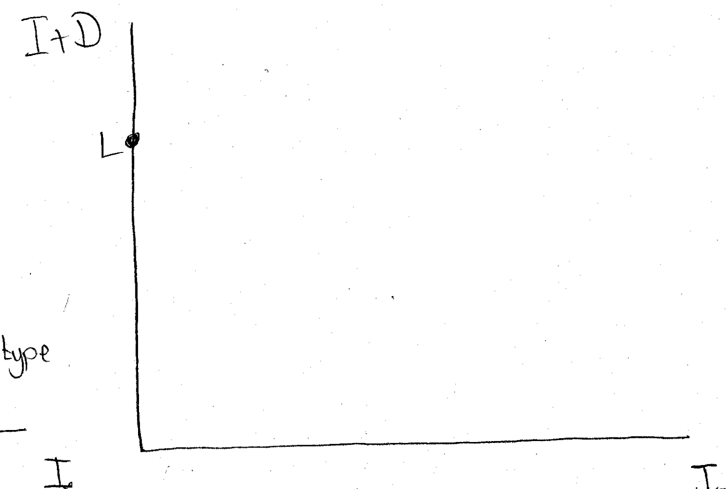
$$\max_{I_H, p_H, I_L, p_L} \beta[I_H - p_H(L - D_H)] + (1-\beta)[I_L - p_L(L - D_L)]$$

s.t. $p_i \underbrace{u(w - D_i - I_i)}_{\text{utility if have loss}} + (1-p_i)u(w - I_i) \geq p_i u(w-L) + (1-p_i)u(w)$

$p_i u(w - D_i - I_i) + (1-p_i)u(w - I_i) \geq p_i u(w - D_{-i} - I_{-i}) + (1-p_i)u(w - I_{-i})$ (IC-i) $i \in \{L, H\}$

where w is the wealth of the consumer





Isoprofit: $p_H(I_H + D_H - L) + (1 - p_H)I_H = 0$

slope: $-\frac{d(I_H + D_H)}{dI_H} = -\frac{1-p_H}{p_H} > \underbrace{-\frac{1-p_L}{p_L}}_{\text{slope}}$ slope of zero profit line for L type

Indifference curve:

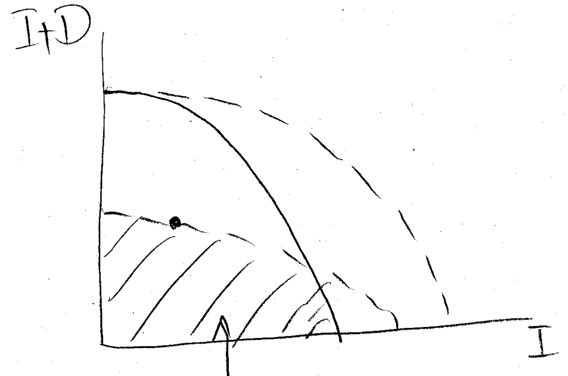
$$p_H u(w-(D_H+I_H))+(1-p_H)u(w-I_H)=\bar{u}$$

$$\text{slope}=-\frac{1-p_H}{p_H}\frac{u'(w-I_H)}{u'(w-(D_H+I_H))}$$

Single-crossing property:

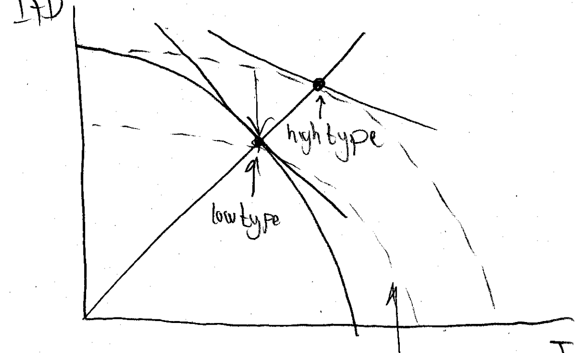
- Marginal willingness to pay to transfer money from the good state to the bad state is always higher for the p_H-type.
- The low type has steeper indifference curves

$\boxed{2}$ $(IR_L)+(IC_H) \Rightarrow (IR_H)$



satisfy both (IR_L) and (IC_H) => satisfies (IR_H)

$\boxed{3}$

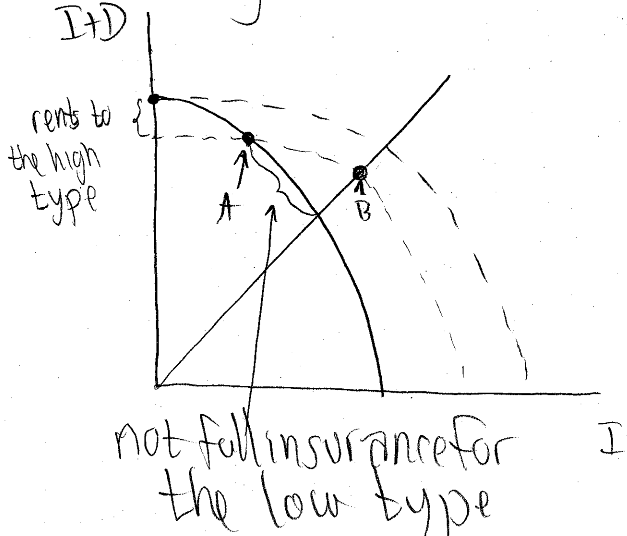


- First best => Full insurance for both types.

high type wants to mimic the low type

- We can ignore (IC_L).

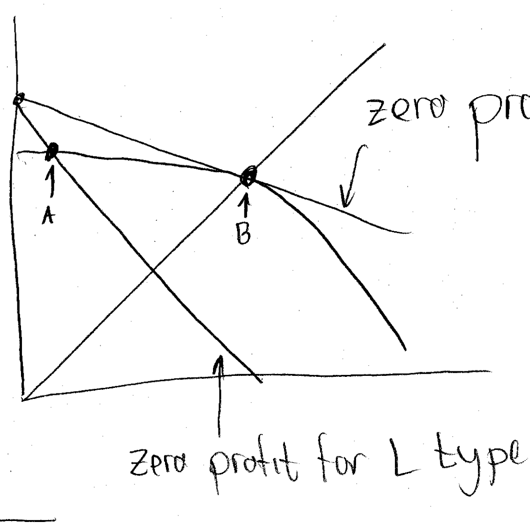
4] Binding (IC_H) and (IR_L)



A - contract for the low type
B - contract for the high type

5] - Rents to the high type
- Only partial insurance to the low type.

With competition:



- A offered to L type
- B offered to H type

Optimal income taxation

- Individual: $u(\theta e - t - \psi(e))$

- effort - not observable
- type θ - not observable $Pr[\theta = \theta_H] = \beta$
  - $y = \theta e$ - observable

SP: max expected utility subject to the resource constraint being satisfied

[1] (y_H, T_H), (y_L, T_L) - express contracts in terms of observables.
- (IC_H), (IC_L)

Note: $y = \theta_H e_H \Rightarrow e_H = \frac{y}{\theta_H}$. Can express this as (e_H, T_H), (e_L, T_L) contract.

[2] There is no step 2, and no exclusion of low productivity types

[3] FB? $\theta_i = \psi'(e_i) \Rightarrow e_H^* > e_L^*$

Perfect insurance ex ante:

$$\theta_H e_H^* - t_H - \psi(e_H^*) = \theta_L e_L^* - t_L - \psi(e_L^*)$$

[4] (IC_H) binding. Make low type do less effort and also consume less.

$$y_H - t_H - \psi\left(\frac{y_H}{\theta_H}\right) \geq y_L - t_L - \psi\left(\frac{y_L}{\theta_H}\right)$$

$\Rightarrow$ trade-off b/t redistribution vs optimal effort

$\Rightarrow$ efficient production by H type. Not enough redistribution.